



PATENT
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
In Re application of J. BANGO ET AL

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Examiner:
VARGOT, MATHIEU D.
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:Date 06/04/08
Attorney Docket: JB0602

Re: The Application For:
FABRICATION OF IMPROVED CONTACT LENS
UTILIZING POLYMER ELECTROSPINNING

Declaration In Support Of Patentability Under 37 C.F.R. 1.132

Re: THE FOLLOWING DECLARATION OF GARY E. WNEK

4 June, 2008

DECLARATION AND STATEMENT OOF GARY WNEK:
RELATING TO "Simpson et al publication US No. US 2002/0090725,
PUBLISHED ON July 11, 2002

I, Dr. Gary Wnek, do hereby say and declare: This is my statement relating to my review of a prior art patent reference on which I am listed as a co-inventor, and which is cited by patent examiner Niebauer, as that reference relates to pending patent application number 10/414,796.

My qualifications for making the following declaration:

Past and Present Employment:

GARY E. WNEK
Joseph F. Toot, Jr., Professor of Engineering
Chair, Department of Macromolecular Science and Engineering
Faculty Director, The Institute for Management and Engineering (TiME)
Case Western Reserve University
Cleveland, Ohio 44106-7217
216-368-4172; gew5@case.edu
Former Positions

Advisory Board, Department of Chemical Engineering, Worcester Polytechnic Institute, 1990-; Chair, 2003-

Research Interests

Polymers with unusual electrical or optical properties

Ironically conducting polymers with applications in fuel cells and batteries

Electro active polymers in medicine and biotechnology

Electric field-mediated phenomena: electrostatic polymer processing of nano- and micro fibers and particles; morphology modulation in polymer blends; modulation of optical properties of polymers. Biomaterials for tissue engineering and regenerative medicine

New polymer-based micro fluidic platforms

Date(s) Of Review: 15 August 2007

Prior Art References: Electro processed Collagen, David Simpson et al, US No. US 2002/0090725

I have been engaged in polymer research for nearly 30 years and with electrospinning of polymers for over 10 years.

Ph.D., Polymer Science and Engineering, University of Massachusetts, Amherst,
 1980 Thesis Advisor: Dr. James C. W. Chien
 Date and Place of Birth
 September 9, 1955; Amsterdam, NY
 Publications (See Appendix for complete list)
 Over 130 papers and book chapters; 18 US patents.
 Awards and Honors
 Kern Faculty Fellow, Kern Entrepreneurship Education Network, 2006-07
 Honorary Member, Golden Key International Honor Society, 2005-
 NASA Lecturer, 64th Frontiers in Chemistry Symposium, Case Western Reserve
 University, 2004 Sidney Negus Memorial Lecturer, Virginia Academy of
 Sciences, 1999
 1996 Eastern New York Intellectual Property Law Association Inventor of the
 Year Award (for U.S. patent 5,468,574)
 Union Carbide Lecturer, 44th Frontiers in Chemistry Symposium, Case Western
 Reserve University, 1985 Lecturer, Whitney Symposium on Science and
 Technology, General Electric CR&D, 1985 ARCO Career Development Award,
 1985-1987
 IBM Faculty Development Award, 1983-1985
 Dupont Young Faculty Award, 1980-1983
 Professional Societies
 American Chemical Society (Divisions of Polymer Chemistry and Polymeric
 Materials: Science and Engineering)
 American Institute of Chemical Engineers
 Materials Research Society
 Electrochemical Society
 Product Development Management Association
 Professional Activities
 Co-Editor, Encyclopedia of Biomaterials and Biomedical Engineering (Marcel
 Dekker), 2004-Councilor, ACS Division of Polymer Chemistry, 2005-2007
 Board of Consulting Editors, McGraw-Hill Encyclopedia of Science and
 Technology and Yearbook of Science and Technology, 2002-2004
 Member, Panel on Organic and Hybrid Materials, Materials Research for
 Defense-After-Next, National Materials Advisory Board, 2001-2002
 Scientific Advisory Board, GliaMed, Inc., Bronx, NY, 2003-
 Scientific Advisory Board, Bio-Track LLC, Richmond, VA, 2001-
 Scientific Advisory Board, Energy Voyager Inc., Santa Barbara, CA, 2005-
 Associate Editor, Chemistry of Materials, 1989-1996
 Editorial Board, Chemistry of Materials, 1997-2000
 Editorial Board, Polymer-Plastics Technology and Engineering, 1998-
 Editorial Board, Progress in Polymer Science, 1993-95
 Co-Founder, Dais Corp., 1993 (now Dais Analytic Corp.)
 Co-Founder and CSO, Aegis BioSciences LLC, 1996-
 Co-Founding Inventor, NanoMatrix, Inc., 2000-
 Co-Principal, Class Express LLC, 2004-

The examiner makes reference to a corona discharge as an ion source to mitigate fiber instability. A corona is in effect a plasma, and as such over a thousand of degrees F in temperature. Such high temperature might denature collagen.

Use of a plasma produces ozone, which might further destabilize collagen. As such, I would not see a corona as being an enabling means to minimize fiber spinning instability for this application.

Finally, the examiner cites the use of the microprocessor in the spinning operation. The microprocessor was used in the process taught in Simpson to direct the angle and distance and voltage of the tip of the needle with respect to the target, depending on the desired fiber morphology and deposition required for a given application.

The microprocessor commanded a fixed voltage once our process was activated.

The microprocessor in the Simpson process was not used to deliver an AC rather than DC potential to the electrospinning source and target. The mats produced were contemplated to be as structurally sound as we could make. We did not contemplate making an optically clear mat.

As a result of not contemplating the need to make an optically clear mat, we were never faced with the problems associated making micro fibers and forming a fiber matrix that would be optically clear. We were not aware of the problem with hydrodynamic instability but because we were making fiber with a larger diameter than those characterized in the subject application, the need for formatting a matrix aperture having optical clarity was not an area of investigation that we thought of, or that we intended to pursue.

I am currently Chair of Macromolecular Science and Engineering at Case Western Reserve University in Ohio. I was a principal Investigator at Virginia Commonwealth University in the electrospinning, henceforth electro-processing, program at VCU which resulted in the cited patent reference US No. 2002/0090725 to Simpson et al. I am a co-inventor on that application.

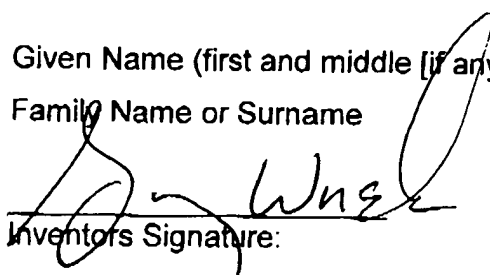
The purpose of our research which was subsequently reported in the literature and documented in the cited patent reference, was to produce a biomimetic tissue scaffold suitable for, and to encourage, cellular in growth and neovascularization. Our team had no interest in and to my knowledge never thought about removing the charge from the electrospun fibers as the electrohydrodynamic instability cited in the Bango application does not present itself as a problem in the application of tissue scaffolds. In our work, we had no interest in making electrospun collagen fibers optically clear. Optical clarity in the visible spectrum requires mimicking the fibril diameter and mean fibril spacing exhibited by native tissue, specifically under 100 nanometers in diameter. We rarely if ever spun fibers under 100 nanometers. The diameter of the individual fibers in the cited Simpson et al. application was to be larger than those in the Bango et al. application.

I consider the use of AC or alternating current for mitigating spray instability the electrospray source to be novel. The need for AC voltage was not necessary nor contemplated for the scaffolding application taught in the Simpson publication.

Ultraviolet light and/or radiation was used in the process taught in the Simpson publication to promote polymer crosslinking or fiber sterilization. Ultraviolet light was not used in the Simpson process taught in the Simpson publication to remove any charge buildup on the spun fiber.

I hereby declare that all statements made herein of my own know edge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the know edge that statements, and the like, so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such false statements may jeopardize the validity of the application or any patent issued thereon.

Given Name (first and middle [if any]) GARY E
Family Name or Surname WNEK


Inventors Signature:

Date:

Residence City Cleveland

State Ohio

Country USA

Citizenship U.S.

Mailing Address Case Western Reserve University
Joseph F. Toot, Jr., Professor of Engineering
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APPENDIX

Authored and Co-Authored Publications (130)

E. Karasz, J. C. W. Chien, R. Galkiewicz, G. E. Wnek, A. J. Heeger and A. G. MacDiarmid, "Nascent Morphology of Polyacetylene," *Nature*, 282, 286 (1979).

E. Wnek, J. C. W. Chien, F. E. Karasz, M. A. Druy, A. G. MacDiarmid, Y. W. Park and A. J. Heeger, "Variable Density Conducting Polymers: Conductivity and

Thermopower Studies of a New Form of Polyacetylene, $(CH)_x$," J. Polym. Sci. Polym. Lett. Ed., 17, 779 (1979).

G. E. Wnek, J. C. W. Chien, F. E. Karasz and C. P. Lillya, "Electrically Conductive Derivative of Poly(pphenylene vinylene)," Polymer, 20, 1441 (1979).

J. C. W. Chien, F. E. Karasz, G. E. Wnek, A. G. MacDiarmid and A. J. Heeger, "Polymerization of Acetylene," J. Polym. Sci. Polym. Lett. Ed., 18, 45 (1980).

J. C. W. Chien, F. E. Karasz and G. E. Wnek, "Soliton Formation and Cis-Trans Isomerization in Polyacetylene," Nature, 285, 391 (1980).

A. Feldblum, Y. W. Park, A. J. Heeger, A. G. MacDiarmid, G. E. Wnek, F. E. Karasz and J. C. W. Chien, "Microwave Properties of Low-Density Polyacetylene," J. Polym. Sci. Polym. Phys. Ed., 19, 173 (1981).

J. C. W. Chien, G. E. Wnek, F. E. Karasz and J. A. Hirsch, "Electrically Conducting Acetylene/Methylacetylene Copolymers - Synthesis and Properties," Macromolecules, 14, 479 (1981).

G. E. Wnek, J. Capistran, J. C. W. Chien, L. C. Dickinson, R. Gable, R. Gooding, K. Gourley, F. E. Karasz, C. P. Lillya and K. D. Yao, "Studies in Conducting Polymers," in Conductive Polymers, Polym. Sci. & Tech. Ser., Vol. 15, R. B. Seymour, ed., Plenum, 183 (1981).

J. C. W. Chien, G. E. Wnek, F. E. Karasz, J. M. Warakowski, L. C. Dickinson, A. J. Heeger and A. G. MacDiarmid, "Electron Paramagnetic Resonance Saturation Characteristics of Pristine and Doped Polyacetylenes," Macromolecules, 15, 614 (1982).

M. E. Galvin and G. E. Wnek, "Electrically Conductive Polymer Composites: Polymerization of Acetylene in Polyethylene" Polym. Comm., 23, 795 (1982).

G. G. C. Li, D. A. Kidwell, D. W. Brown, E. E. Hall and G. E. Wnek, "Characterization of Polyacetylene by Ozonolysis," J. Polym. Sci. Polym. Chem. Ed., 21, 301 (1983).

A. Guiseppi-Elie and G. E. Wnek, "Stabilization of Iodine-Doped Polyacetylene in Aqueous Solutions," J. Chem. Soc. Chem. Comm., 63 (1983).

B. Rosen, J. Chang, G. E. Wnek, R. J. Lindhardt and R. S. Langer, "Bioerodible Polyanhydrides for Controlled Drug Delivery," Biomaterials, 4, 131 (1983).

M. E. Galvin and G. E. Wnek, "Characterization of Polyacetylene/Low Density Polyethylene Composites Prepared by In-Situ Polymerization," J. Polym. Sci. Polym. Chem. Ed., 21, 2727 (1983).

M. E. Galvin and G. E. Wnek, "Towards the Synthesis of Electroactive Block Copolymers via Anionic-to-Ziegler-Natta Transformation Reactions," Polym. Prepr., 24(2), 14 (1983).

L. R. Dalton, H. Thomann, H. Kim, A. Morrobel-Sosa, C. Chiu, M. E. Galvin, G. E. Wnek, Y. Tomkiewicz, N. S. Shiren, B. Robinson and A. L. Kwiram, "Characterization of the Wavefunction and Dynamics of the Soliton in Polyacetylene and Composites of Polyacetylene/ Polyethylene," J. Appl. Phys., 54 (10), 5583 (1983).

M. E. Galvin, G. F. Dandreaux and G. E. Wnek, "Conductive Hybrids Based on Polyacetylene: Copolymers and Blends," in Polymers in Electronics, T. Davidson, ed., ACS Symp. Ser. 242, Ch. 40 (1984).

M. S. Dresselhaus, B. Wasserman and G. E. Wnek, "Ion Implantation of Polymers," in *Ion Implantation and Ion Beam Processing of Materials*, G. K. Hubler, O. W. Holland, G. R. Clayton and C. W. White, eds., MRS Symp. Vol. 27, Elsevier, North Holland, 413 (1984).

B. Wasserman, G. Braunstein, M. S. Dresselhaus and G. E. Wnek, "Implantation-Induced Conductivity in Polymers," in *Ion Implantation and Ion Beam Processing of Materials*, G. K. Hubler, O. W. Holland, G. R. Clayton and C. W. White, eds., MRS Symp. Vol. 27, Elsevier, North Holland, 423 (1984).

G. E. Wnek, B. Wasserman and I. H. Loh, "Structure/Majority Carrier Relationships in Ion Implanted Polymer Films," in *Ion Implantation and Ion Beam Processing of Materials*, G. K. Hubler, O. W. Holland, G. R. Clayton and C. W. White, eds., MRS Symp. Vol. 27, Elsevier, North Holland, 435 (1984).

M. E. Galvin and G. E. Wnek, "Blends and Block Copolymers Containing Polyacetylene," *Polym. Prepr.*, 25 (2), 229 (1984).

D. R. Uhlmann, B. J. J. Zielinski and G. E. Wnek, "The Ceramist as Chemist - Opportunities for New Materials," in *Better Ceramics Through Chemistry*, C. J. Brinker, D. E. Clark and D. R. Ulrich, eds., MRS Symp. Vol. 32, Elsevier, North Holland, 59 (1984).

M. E. Galvin and G. E. Wnek, "Towards the Synthesis of Electroactive Block Copolymers via Anionic-to-Ziegler-Natta Transformation Reactions. 2. Evidence for the Formation of Styrene/Acetylene Diblock Copolymers," *Polym. Bull.*, 13, 109 (1985).

Guisseppi-Elie and G. E. Wnek, "Introduction of Hydrophilicity to Polyacetylene Film Surfaces," *J. Polym. Sci. Polym. Chem. Ed.*, 23, 2601 (1985).

G. E. Wnek, B. Wasserman, M. S. Dresselhaus, S. E. Tunney and J. K. Stille, "Ion Implantation of a Polyquinoline," *J. Polym. Sci. Polym. Lett. Ed.*, 23, 609 (1985).

Wasserman, M. S. Dresselhaus, G. Braunstein, G. E. Wnek and G. Roth, "Electron Spin Resonance Study of Ion-Implanted Polymers," *J. Electron. Mater.* 14(2), 157 (1985).

G. F. Dandreaux and G. E. Wnek, "On the Anionic Polymerization of Succinonitrile in Methanol," *Polym. Mat. Sci. Eng.*, 53, 92 (1985).

D. H. Whitney and G. E. Wnek, "Characterization and Catalytic Activity of Nickel-Derivatized Polyacetylene," *Polym. Mat. Sci. Eng.*, 53, 659 (1985).

G. F. Dandreaux and G. E. Wnek, "Succinonitrile Polymerization Revisited," *Japan-U.S. Polymer Symp. Preprints*, 191 (1985).

G. E. Wnek, "Electrically Conducting Polymer Composites," in *Handbook of Conductive Polymers*, T. Skotheim, ed., Dekker, Ch. 6 (1986).

G. E. Wnek, "A Proposal for the Mechanism of Conduction in Polyaniline," *Synth. Metals*, 15, 213 (1986).

Guisseppi-Elie, G. E. Wnek and S. P. Wesson, "Wettability of Polyacetylene: Surface Energetics and Determination of Material Properties," *Langmuir*, 2, 508 (1986.)

Wasserman, M. S. Dresselhaus, M. Wolf, G. E. Wnek and J. D. Woodhouse, "Transient Transport Measurements on Ion Implanted Polymers," *J. Appl. Phys.*, 60, 668 (1986)

M. Sakamoto, B. Wasserman, M. S. Dresselhaus, G. E. Wnek, B. S. Elman and D. J. Sandman, "Enhanced Electrical Conductivity of Polydiacetylene Crystals by Chemical Doping and Ion Implantation," *J. Appl. Phys.*, 60, 2788 (1986).

S. Parkhurst, W. F. Doyle, L. A. Silverman, S. Singh, M. P. Andersen, D. McClurg, G. E. Wnek and D. Uhlmann, "Siloxane-Modified SiO₂-TiO₂ Glasses Via Sol-Gel," in *Better Ceramics Through Chemistry*, C. J. Brinker and D. R. Ulrich, eds., MRS Symp., Vol 73, 769 (1986).

Y. Wei and G. E. Wnek, "Stereochemistry and Mechanistic Study of Group Transfer Polymerization," *Polym. Prepr.*, 28(1), 252 (1987).

L. J. Buckley, D. K. Roylance and G. E. Wnek, "Influence of Dopant Ion and Synthesis Variables on the Mechanical Properties of Poly(Pyrrolylium Anion) Films," *J. Polym. Sci. Polym. Phys. Ed.*, 25(10), 2179 (1987).

W. W. Focke, G. E. Wnek and Y. Wei, "The Influence of Oxidation State, pH and Counterion on the Conductivity of Polyaniline," *J. Phys. Chem.*, 91(22), 5813 (1987).

G. E. Wnek, "Electrically Conductive Polymers," *MRS Bulletin*, 12(8), 36 (1987).

H. Whitney and G. E. Wnek, "Reactions of N-Type (Reduced) Polyacetylene with Alkyl Halides," *Macromolecules*, 21, 266 (1988).

W. W. Focke and G. E. Wnek, "Electrochemistry of Polyaniline: Consideration of a Dimer Model," in *Nonlinear Optical and Electroactive Polymers*, P. N. Prasad and D. R. Ulrich, eds., Plenum, New York, p. 315 (1988).

Clough, S. Tripathy, X. Sun, B. Orchard and G. Wnek, "A Comment on Random vs. Non-Random Defect Placement in Polyacetylene," *Makromol. Chem., Rapid Commun.* 9, 535 (1988).

W. W. Focke and G. E. Wnek, "Conduction Mechanisms in Polyaniline (Emeraldine Salt)," *J. Electroanal. Chem.*, 256, 343 (1988).

G. E. Wnek, P. Kitipichai, G. Frysinger, G. M. Korenowski, I. Gorodisher, D. R. Uhlmann and Y. Wei, "Transmission of Electron Density Through Moieties Between Donors and Acceptors: Possible Implications for Nonlinear Optics," *MRS Symp. Proc. Vol 109*, A. J. Heeger, J. Orenstein and D. R. Ulrich, eds., 139 (1988).

W. W. Focke, Y. Wei, G. E. Wnek, A. Ray and A. G. MacDiarmid, "Synthesis and Electrochemistry of Substituted Polyanilines," *J. Phys. Chem.*, 93, 495 (1989).

G. E. Wnek, "Charge Carrier Chemistry in Electroactive Polymers," *Proceedings of the IUCCP Symposium on Functional Polymers*, C. R. Martin and D. E. Bergbreiter, eds., Texas A&M University, Plenum, p. 107 (1989).

G. Venugopal, S. Krause and G. E. Wnek, "Modification of Polymer Blend Morphology Using Electric Fields," *J. Polym. Sci. Polym. Lett. Ed.*, 27, 497 (1989).

C.-Y. Yang and G. E. Wnek, "Synthesis of Polysiloxanes Bearing Polar Groups," *Polym. Prepr.*, 30(2), 177 (1989).

P. Kitipichai, R. LaPeruta, G. M. Korenowski, G. E. Wnek, I. Gorodisher and D. R. Uhlmann, "New Polymers for Second Harmonic Generation," *Polym. Prepr.*, 30(2), 176 (1989).

F. McDonald, N. P. Vlannes, G. E. Wnek and T.-M. Lu, "Dielectric, Conducting and Photonic Polymers for Devices in Multichip Packaging," *Mat. Res. Soc. Proc.*, Vol. 154, 387 (1989).

A. Guiseppi-Elie and G. E. Wnek, "Aqueous Reactivity of Polyacetylene: pH Dependence," *J. Phys. Chem.*, 94, 3192 (1990).

Y. Wei, K. F. Hsueh, S. Nagy, A. Ray, A. G. MacDiarmid, A. J. Epstein and G. E. Wnek, "Spectroscopic and Molecular Weight Studies of Polytoluidines," *Mat. Res. Soc. Proc.*, Vol. 173, 341 (1990)

D. H. Suh and G. E. Wnek, "On The Iodine Doping of Non-Conjugated Polymers," *Polym. Prepr.*, 31(1), 410 (1990).

G. Venugopal, S. Krause and G. E. Wnek, "The Effects of Electric Fields on Polymer Blend Morphologies," *Polym. Prepr.*, 31(1), 377 (1990).

G. E. Wnek, K. Gault, J. Serpico, C.-Y. Yang, G. Venugopal and S. Krause, "Synthesis and Processing of Polymer Electrolyte Hosts," in *Second International Symposium on Polymer Electrolytes*, B. Scrosati, ed., Elsevier, 73 (1990).

J. R. Martinez, J. C. W. Chien and G. E. Wnek, "Study of Poly(aniline) by Nuclear Magnetic Resonance," *Revista UIS Investigaciones*, 19 (1-2) 55- 68 (1990).

J. F. McDonald, N. P. Vlannes, T.-M. Lu, G. E. Wnek, T. C. Nason, and L. You, "Photonic Multichip Packaging (PMP) using Electro-Optic Organic Materials and Devices," *SPIE*, Vol. 1390, *Int. Conf. on Advances in Interconnection and Packaging*, 286 (1991).

L. A. Prezyna, Y.-J. Qiu, J. R. Reynolds, and G. E. Wnek, "Interaction of Cationic Polypeptides with Electroactive Polypyrrole/Poly(styrenesulfonate) and Poly(N-methylpyrrole)/Poly(styrenesulfonate) Films," *Macromolecules*, 24, 5283 (1991).

P. Kitipichai, R. LaPeruta, G. M. Korenowski, G. E. Wnek and I. Gorodisher, "Synthesis, Poling and Optical Characterization of Polyurethanes Bearing NLO-Active Chromophores," *Polym. Prepr.*, 32 (3), 146 (1991).

R. LaPeruta, P. Kitipichai, G. E. Wnek and G. M. Korenowski, "Optical Four-Wave Mixing in Silver Colloid-Polymer Composite," *Polym. Prepr.*, 32 (3), 148 (1991).

G. E. Wnek and P. J. Ficalora, "Relating the Macroscopic to the Microscopic," *CHEMTECH*, 662, November 1991.

J. M. Serpico, G. E. Wnek, S. Krause, T. W. Smith, D. J. Luca and A. Van Laeken, "Effect of Block Copolymer on the Electric Field-Induced Morphology of Polymer Blends," *Macromolecules*, 24, 6879 (1991).

R. LaPeruta, E. A. Van Wagenen, J. J. Roche, P. Kitipichai, G. E. Wnek, and G. M. Korenowski, "Preparation and Characterization of Silver Colloid/Polymer Composite Nonlinear Optical Materials," *SPIE Proceedings on Non-Linear Optics and Materials*, 1497, 57 (1991).

C.Y. Yang and G. E. Wnek, "Synthesis and Reactions of Silyl Ketene Acetal-Modified Polysiloxanes. Preparation and Preliminary Dielectric Characterization of Some New Polysiloxanes." *Polymer*, 33, 4191 (1992).

J. K. Liu and G. E. Wnek, "Novel Synthesis of Sulfonated Silicones," *Polym. Prepr.*, 33(1), 970 (1992).

J. M. Serpico, G. E. Wnek, S. Krause, T. W. Smith, D. J. Luca and A. Van Laeken, "Electric Field-Induced Morphologies in Diblock Copolymer Containing Polymer Blends," *Polym. Prepr.*, 33(1), 463 (1992).

T. W. Smith, D. J. Luca, M. A. Abkowitz, G. E. Wnek, J. M. Serpico and M. D. Whitmore, "Domain Swelling in Micellar Compositions of Poly(Styrene-block-Oxyethylene) in Polystyrene," *Polym. Prepr.*, 33(1), 469 (1992).

D. B. O'Connor, G. W. Scott, K. Tran, D. R. Coulter, V. M. Miskowski, A. E. Stiegman and G. E. Wnek, "The Low-Energy, Charge-Transfer Excited States of 4-Amino-4'-Nitrodiphenyl Sulfide," *J. Chem. Phys.*, 97, 4018 (1992).

J. M. Serpico, G. E. Wnek, S. Krause, T. W. Smith, D. J. Luca and A. Van Laeken, "Electric Field-Induced Morphologies in Poly(Styrene)-Poly(Styrene-b-Ethyleneoxide) Blends," *Macromolecules*, 25, 6373 (1992).

G. Venugopal, S. Krause and G. E. Wnek, "Morphological Variations in Polymer Blends Prepared in Electric Fields," *Chem. Mater.*, 4, 1334 (1992).

R. Malik and G. E. Wnek, "Silane Coupling Agents on Silica and Fiberglass as Studied by Electron Spin Resonance," *Polym. Mater. Sci. Eng.*, 67, 13 (1992).

Z. Zhu, J. Rider, C. Y. Yang, M. E. Gilmartin and G. E. Wnek, "Synthesis of PMMA Star Polymers with Siloxane Cores via Group Transfer Polymerization Using Silyl Ketene Acetal-Functionalized Cyclic Siloxanes," *Macromolecules*, 25, 7330 (1992).

P. Zhou, X. Chen, H. L. Frisch, Z. Zhu, J. Rider and G. E. Wnek, "Effect of Molecular Weight and Molecular Architecture of PMMA on the Phase Morphology of Pseudo-IPN's of PCU/PMMA," *Macromolecules*, 25, 7334 (1992).

P. Kitipichai, R. LaPeruta, G. M. Korenowski and G. E. Wnek, "Synthesis and Optical Characterization of New NLO-Active Polyurethanes and Silver Colloidal Suspension in a Select Polyurethane," *MRS Symp. Proc. Vol. 247*, L. Y. Chiang, A. F. Garito and D. J. Sandman, eds., 117 (1992).

P. Kitipichai, R. LaPeruta, G. M. Korenowski and G. E. Wnek, "In-Situ Poling and Synthesis of NLO Chromophore-Bearing Polyurethanes for Second Harmonic Generation," *J. Polym. Sci. Polym. Chem. Ed.*, 31, 1365 (1993).

G. Venugopal, S. Krause and G. E. Wnek, "Phase Behavior of Poly(Ethylene Oxide)/Poly(methylmethacrylate) Blends in the Presence of Alkali Metal Salts," *Polymer*, 34, 3241 (1993).

V. R. Shastri and G. E. Wnek, "Effect of Dopant Ion on Cell Growth on Polypyrrole Thin Films," *Polym. Prepr.*, 34(2), 70 (1993).

J.-K. Liu and G. E. Wnek, "Reactions of Silyl Ketene Acetal-Functionalized Polysiloxanes. Synthesis of Sulfonated Polysiloxanes," *Macromolecules*, 27, 4080 (1994).

Z. Zhu, C. Y. Yang, A. G. Einset, W.-X. Chen and G. E. Wnek, "Synthesis of Polysiloxanes Bearing Cyclic Carbonate Side Chains. Dielectric Properties and Ionic Conductivities of Lithium Triflate Complexes," *Macromolecules*, 27, 4076 (1994).

P. Caglar and G. E. Wnek, "Glucose-Sensitive Polypyrrole/Poly(Styrenesulfonate) Films Containing Co-Immobilized Glucose Oxidase and (Ferrocenylmethyl) Trimethylammonium Bromide," *J. Macromol. Sci. Pure Appl. Chem.*, A32, 349 (1995).

- G. E. Wnek and P. J. Ficalora, "Chemistry of Materials Courses at Rensselaer Polytechnic Institute," ACS Symp. Ser. 245, Materials Chemistry: An Emerging Discipline, L. V. Interrante, L. A. Casper and A. B. Ellis, eds., ACS, Washington, 62 (1995).
- P. Lam, P. R. Elliker, G. E. Wnek and T. M. Przybycien, "Towards An Electrochemically Modulated Chromatographic Stationary Phase," J. Chromatog. A, 707, 29 (1995).
- A. G. Einset and G. E. Wnek, "Polymer Electrolyte Review," in Handbook of Solid State Batteries and Capacitors, M. Z. A. Munshi, ed., World Scientific, Singapore (1995).
- G. E. Wnek, J. N. Rider, J. M. Serpico, A. G. Einset, S. G. Ehrenberg and L. Raboin, "New Hydrocarbon Proton Exchange Membranes Based on Sulfonated Styrene-Ethylene/Butylene-Styrene Triblock Copolymers," Proc. First Int'l Symposium on Proton Conducting Membrane Fuel Cells, Electrochemical Society Proc. Vol. 95-23, 247 (1995).
- D. J. Trantolo, J. D. Gresser, D. L. Wise, M. G. Mogul, T. M. Cooper and G. E. Wnek, "Electric Field Alignment of Biopolymers for Nonlinear Optical Applications," in Optical and Photonic Applications of Electroactive and Conducting Polymers, SPIE Proc. Vol. 2528, 219 (1995).
- Y. Ye, G. E. Wnek, S. Krause and T. W. Smith, "Effect of Crystallization on the Morphologies of Block Copolymer/Homopolymer Blends Cast in an Electric Field," J. Polym. Sci. Polym. Phys. Ed., 34, 309 (1996).
- T. W. Smith, M. A. Abkowitz, G. C. Conway, D. J. Luca, J. M. Serpico and G. E. Wnek, "Dielectric Spectroscopy of Poly(Styrene)/Poly(Ethylene Oxide) Composites," Macromolecules, 29, 5042 (1996).
- T. W. Smith, M. A. Abkowitz, G. C. Conway, D. J. Luca, J. M. Serpico and G. E. Wnek, "Dielectric Spectroscopy of Binary Poly(Styrene)/Poly(Styrene-b-Ethylene Oxide) Blends and Ternary Composites of Poly(Styrene)/ Poly(Styrene-b-Ethylene Oxide) Swollen with Homopoly(Ethylene Oxide)," Macromolecules, 29, 5046 (1996).
- C. Karuppaiah, J. N. Rider and G. E. Wnek, "Applications of a Sulfonated Triblock Copolymer for Chemically Modified Electrodes," Polym. Prepr., 37 (1), 428 (1996).
- Y. Ye, J. N. Rider, A. Sekhar, G. Wong, K. Trout, K. Graczyk, W. Brown, J. Gross, M. Stewart, M. Kamler and G. E. Wnek, "Electromechanical Studies of a Novel Block Polymer Hydrogel," Polym. Prepr., 37 (1), 394 (1996).
- C. Roberts, G.-R. Yang, A. Coccoziello, Y.-P. Zhao, G. E. Wnek and T.-M. Lu, "High Electro-Optic Side-Chain Polymer by Vapor Deposition Polymerization," Appl. Phys. Lett., 68, 2067, (1996).
- J. D. Gresser, D. J. Trantolo, D. L. Wise, D. E. Altobelli, M. J. Yaszemski and G. E. Wnek, "Biopolymer Alloy for Surgical Plates," in Human Biomaterials Applications, D. L. Wise, D. J. Trantolo, D. E. Altobelli, M. J. Yaszemski and J. D. Gresser, eds., Humana Press, Totowa, NJ, pp. 99-113 (1996).
- J. D. Gresser, D. J. Trantolo, H. Nagaoka, D. L. Wise, D. E. Altobelli, M. J. Yaszemski and G. E. Wnek, "Bone Cement, Part 1: Biopolymer for Avulsive

Maxillofacial Repair," in Human Biomaterials Applications, D. L. Wise, D. J. Trantolo, D. E. Altobelli, M. J. Yaszemski and J. D. Gresser, eds., Humana Press, Totowa, NJ, pp. 169-185 (1996).

L. Wise, D. J. Trantolo, H. Nagaoka, J. D. Gresser, D. E. Altobelli, M. J. Yaszemski and G. E. Wnek, "Bone Cement, Part 2: Biomaterials to Restore Function in People With Physical Disabilities" in Human Biomaterials Applications, D. L. Wise, D. J. Trantolo, D. E. Altobelli, M. J. Yaszemski and J. D. Gresser, eds., Humana Press, Totowa, NJ, pp. 187-201 (1996).

G. E. Wnek, 'Perspective: Comments on "Simultaneous Polymerization and Formation of Polyacetylene Film on the Surface of a Concentrated Soluble Ziegler-Type Catalyst Solution," by T. Ito, H. Shirakawa and S. Ikeda, J. Polym. Sci.: Polym. Chem. Ed., 12, 11, 1974,' J. Polym. Sci. Part A: Polym. Chem., 34, 2531 (1996).

M. A. Palmer, J. B. Hudson, C. T. Moynihan and G. E. Wnek, "Using the Internet in a Freshman Engineering Course," J. Mater. Educ., 18, 35 (1996).

D. J. Trantolo, M. G. Mogul, D. L. Wise, G. E. Wnek, D. O. Frazier and J. D. Gresser, "Space Processing of Biopolymer/Metal Composites for NLO Applications," in *Space Processing of Materials*, SPIE, 2809, 106 (1996).

M. A. Karasz and G. E. Wnek, "Electrically Conducting Polymers: Newer Applications," in *Macromolecular Design of Polymeric Materials*, K. Hatada, T. Kitayama and O. Vogl, eds, Marcel Dekker, New York, Ch. 32, p. 561 (1997).

M. G. Mogul, D. J. Trantolo, J. D. Gresser and G. E. Wnek, "Laminar Structures in Ordered Poly(α -Benzyl -L-Glutamate) Films Aligned in Electric Fields," In *Electrical and Optical Polymer Systems: Fundamentals, Methods and Applications*, D. L. Wise, G. E. Wnek, D. J. Trantolo, T. M. Cooper and J. D. Gresser, eds., Marcel Dekker, New York, Ch. 20, pp-681-702 (1998).

B. M. Sheikh-Ali and G. E. Wnek, "Advanced Polymeric Materials: Functional Electroactive Polymers," in *Chemistry of Advanced Materials - A New Discipline*, L. V. Interrante and M. Hampden-Smith, eds., Wiley-VCH, New York, pp. 73-97 (1998).

G. Mogul, D. L. Wise, J. D. Gresser, D. J. Trantolo, G. E. Wnek and C. A. DiMarzio, "Part I: Polymer Optical Guided-Wave Devices," in *Photonic Polymer Systems: Fundamentals, Methods and Applications*, D. L. Wise, D. J. Trantolo, T. M. Cooper, G. E. Wnek and J. D. Gresser, eds., Marcel Dekker, New York, Ch. 14, pp-517-536 (1998).

D. J. Trantolo, J. D. Gresser, D. L. Wise, G. J. Kowalski, D. V. G. L. N. Rao, F. J. Aranda, and G. E. Wnek, "Part II: Sensor Protection From Lasers," in *Photonic Polymer Systems: Fundamentals, Methods and Applications*, D. L. Wise, D. J. Trantolo, T. M. Cooper, G. E. Wnek and J. D. Gresser, eds., Marcel Dekker, New York, Ch. 14, pp-537-569 (1998).

Tunoglu, P. Caglar and G. E. Wnek, "The Immobilization of Ionic and Neutral Crown Ether Dyes to an Anionic Polymer and Use as a Chemical Sensor for Metal Ions," *J. Macromol. Sci., Pure Appl. Chem.*, A35(4), 637 (1998).

A. Karasz and G. E. Wnek, "Tunable Electroluminescence from Ionomers Doped with Cationic Lumophores," *Electrochim. Acta*, 43, 1623 (1998).

G. E. Wnek, B. M. Sheikh-Ali, J. M. Serpico, S. G. Ehrenberg, T. N. Tangredi, C. Karuppaiah and Y. Ye, "Ion-Conducting and Electroactive Polymer Membranes," *Polym. Prepr.*, 39(1), 52 (1998).

S. M. Ruder, D. L. Embrey, S. D. Allen and G. E. Wnek, "Synthesis of Liquid Crystalline Siloxanes Bearing Mesogens Derived from Cinnamic Acid," *Polym. Prepr.*, 39(1), 294 (1998).

Malick, N. Tunoglu, P. Caglar and G. E. Wnek, "Fiber-Optic Cation Determination Using crown Ether Dyes Immobilized on Polymer Membranes," *Sensors and Actuators*, B53, 204 (1998).

P. Lam, K. Kumar, G. E. Wnek and T. M. Przybycien, "A Prototype Electrochemical Chromatography Column for Protein Separation," *Anal. Chem.*, 71, 4272 (1999).

P. Lam, K. Kumar, G. E. Wnek and T. M. Przybycien, "Electroless Gold Plating of Stainless 31 6L Beads," *J. Electrochem. Soc.*, 146, 2517 (1999).

C. C. Roberts, T. M. Apple and G. E. Wnek, "Curing Chemistry of Phenylethynyl-Terminated Imide Oligomers: Synthesis of ^{13}C -Labeled Oligomers and Solid-State NMR Studies," *J. Polym. Sci. Polym. Chem. Ed.*, 38, 3486-3497 (2000).

J. D. Stitzel, G. L. Bowlin, K. Mansfield, G. E. Wnek and D. G. Simpson, "Electrospraying and Electrospinning of Polymers for Biomedical Applications. Poly(Lactic-co-Glycolic Acid) and Poly(Ethylene-co-Vinyl Acetate)," Proc. of the 32nd Annual SAMPE Meeting, pp. 205-211, November 2000.

C. A. Edmonson, J. J. Fontanella, S. H. Chung, S. C. Greenbaum, and G. E. Wnek, "Complex Impedance Studies of S-SEBS Block Polymer Proton-Conducting Membranes," *Electrochim. Acta*, 46, 1623 (2001).

D. Stitzel, K. Pawlowski, G. E. Wnek, D. G. Simpson and G. L. Bowlin, "Arterial Smooth Muscle Cell Proliferation on a Novel Biomimicking, Biodegradable Vascular Graft Scaffold," *J. Biomaterials Applications*, 15, 1-12 (2001).

G. L. Bowlin, D. G. Simpson, P. Lam and G. E. Wnek, "Electric Field-Mediated Processing of Biomaterials: Toward Nanostructured Biomimetic Systems," *Proc. SPIE on Smart Structures and Materials 2001*, 4332, 455 (2001).

L. C. Dickinson, R. A. Weiss and G. E. Wnek, "NMR Characterization of Sulfonation Blockiness in Copoly(Styrene-Sulfonated Styrene)," *Macromolecules*, 34, 3018 (2001).

A. McGrady, X. Sun, G. E. Wnek, M. Salomon, A. Shiao, H.-P. Lin and D. Chua, "New Materials Derived from Poly(4-Hydroxystyrene) as Lithium Battery Cell Components," *J. Macromol. Sci-Pure Appl. Chem*, A38, 933 (2001).

G. S. Huvard, J. Bara, B. Crosby, J. McLees, N. Cain and G. E. Wnek, "ChemEngine: Realizing Entrepreneurship in Undergraduate Engineering Education," *ASEE Proc.*, June, 2001.

E. D. Boland, G. E. Wnek, D. G. Simpson, K. J. Pawlowski and G. L. Bowlin, "Tailoring Tissue Engineering Scaffolds by Employing Electrostatic Processing Techniques: A Study of Poly (Glycolic Acid)," *J. Macromol. Sci.*, 38: 123 1-43 (2001).

P. Lam, K. J. Wynne and G. E. Wnek, "Surface-Tension-Confined Microfluidics," *Langmuir*, 18, 948-95 1 (2002).

J. A. Matthews, G. E. Wnek, D. G. Simpson and G. L. Bowlin, "Electrospinning of Collagen Nanofibers," *Biomacromolecules*, 3, 232-238 (2002).

E. R. Kenawy, G. L. Bowlin, K. Mansfield, J. Layman, D. G. Simpson, E. Sanders and G. E. Wnek, "Release of Tetracycline Hydrochloride from Electrospun Poly(Ethylene-co-Vinyl Acetate), Poly(L-Lactic Acid), and a Blend," *J. Contr. Release*, 81(1,2), 57-64 (2002).

G. L. Bowlin, K. J. Pawlowski, E. Boland, D. G. Simpson, J. B. Fenn, G. E. Wnek and J. D. Stitzel, "Electrospinning of Polymer Scaffolds for Tissue Engineering," in *Tissue Engineering and Biodegradable Equivalents: Scientific and Clinical Applications*, K. Lewandrowsky, D. J. Trantolo, J. D. Gresser, M. J. Yaszemski, D. E. Altobelli and D. L. Wise, Editors, Marcel Dekker, Ch. 9, pp. 165-178 (2002).

M. Vallarino and G. E. Wnek, "Industrial Inorganic Chemistry: A Junior-Senior Level Interdisciplinary Course," *J. Chem. Educ.*, 79, 832-83 5 (2002).

J. M. Serpico, S. G. Ehrenberg,, J. J. Fontanella, X. Jiao, D. Perahia, K. A. McGrady, E. H. Sanders, G. E. Kellogg and G.E. Wnek, "Transport and Structural Studies of Sulfonated Styrene-Ethylene Copolymer Membranes," *Macromolecules*, 35, 5916-5921 (2002).

E.-R. Kenawy, J. M. Layman, J. R. Watkins, G. L. Bowlin, J. A. Matthews, D. G. Simpson and G. E. Wnek, "Electrospinning of Poly(Ethylene-co-Vinyl Alcohol) Fibers," *Biomaterials*, 24, 907-913 (2003).

G. E. Wnek, M. E. Carr, D. G. Simpson and G. L. Bowlin, "Electrospinning of Nanofiber Fibrinogen Structures," *Nano Lett.*, 3, 213-216 (2003).

L. Yao, T. W. Haas, A. Guiseppi-Elie, G. L. Bowlin, D. G. Simpson, and G. E. Wnek, "Electrospinning and Stabilization of Fully Hydrolyzed Poly(vinyl alcohol) Fibers," *Chem. Mater*, 15, 1860 (2003).

J. A. Matthews, E. D. Boland, G. E. Wnek, D. G. Simpson and G.L. Bowlin, "Electrospinning of Collagen Type II: A Feasibility Study," *J. Bioactive and Biocompatible Polymers*, 18, 125 (2003).

E. H. Sanders, R. Kleofkorn, G. L. Bowlin, D. G. Simpson and G. E. Wnek, "Two-Phase Electrospinning from a Single Electrified Jet: Microencapsulation of Aqueous Reservoirs in Poly(Ethylene-co-Vinyl Acetate) Fibers," *Macromolecules*, 36, 3803 (2003).

J. M. Layman, E.-R. Kenawy, J. R. Watkins, M. E. Carr, Jr., G. Bowlin and G. E. Wnek, "Development of the Biohemostat- a Treatment Modality for High Pressure Bleeding based on Super-Absorbent Polymers and Electrospun Membranes," *Polym. Prepr.*, 44(2), 94 (2003).

L. Gee, G. E. Wnek, S. M. Zhuang, J. M. Layman and P. Lipowicz, "Carbon Fibers from Electrospun Phenolic Resins and Poly(Acrylonitrile) and Their Adsorption Properties," *Polym. Prepr.*, 44(2), 120 (2003).

T. W. Smith and G. E. Wnek, "Modulation of Refractive Index in Polymer Composites: Toward a Synthetic Bio-Optic Lens." *Proceedings of SPIE-The International Society for Optical Engineering*, 5051, [Electroactive Polymer Actuators and Devices (EAPAD)], 389-399 (2003).

D. Boland, K. J. Pawlowski, D. G. Simpson, G. E. Wnek and G.L. Bowlin. "Electrospinning Collagens and Elastin: Preliminary Vascular Tissue Engineering." *Frontiers in Biosciences*, 9, 1422 (2004).

E. H. Sanders, K. A. McGrady, G. E. Wnek, C. A. Edmonson, J. M. Mueller, J. J. Fontanella, S. Suarez and S G. Greenbaum, "Characterization of Electrospayed Nafion Films," *J. Power Sources*, 129, 55 (2004).

G. E. Slaughter, E. Bieberich, G. E. Wnek, K. J. Wynne and A. Guiseppi-Elie, "Improving Neuron-to-Electrode Surface Attachment via Alkanethiol Self-Assembly: An Alternating Current Impedance Study," *Langmuir*, 20, 7189 (2004).

E. D. Boland, T. A. Telemceo, D. G. Simpson, G. E. Wnek and G. L. Bowlin, "Utilizing Acid Pre-Treatment and Electrospinning to Improve Biocompatibility of Poly(Glycolic Acid) for Tissue Engineering," *J. Biomed. Mater. Res. Part B: Applied Biomaterials*, 71b, 144 (2004).

E. D. Boland, B. D. Coleman, C. P. Barnes, D. G. Simpson, G. E. Wnek and G. L. Bowlin, "Electrospinning of Polydioxanone for Biomedical Applications," *Acta Biomaterialia*, 1, 115 (2005).

D. L. Woerdeman, P. Ye, S. Shenoy, R. S. Parnas, G. E. Wnek, and O. Trofimova, "Electrospun Fibers from Wheat Protein: Investigation of the Interplay between Molecular Structure and the Fluid Dynamics of the Electrospinning Process," *Biomacromolecules*, 6, 707 (2005).

S.L. Shenoy, H. L. Frisch, W. D. Bates and G. E. Wnek, "Role of Chain Entanglements on Fiber Formation During Electrospinning of Polymer Solutions: Good Solvent, Non-Specific Polymer-Polymer Interaction Limit," *Polymer*, 46, 3372 (2005).

O. A. Baturina and G. E. Wnek, "Characterization of PEM Fuel Cells with Catalyst Layers Obtained by Electrospraying," *Electrochem. Solid State Lett.*, 8, A267 (2005).

S. L. Shenoy, W. D. Bates and G. E. Wnek, "Correlation Between "Electrospinnability" and Physical Gelation," *Polymer*, 46, 8990-9004 (2005).

G. E. Wnek and S. C. Cort, "Product and Process Design and Delivery: Invention Through to Innovation," *American Society of Engineering Education Proceedings*, June, 2005

T. Telemeco, C. Ayers, G. L. Bowlin, G. E. Wnek, E. D. Boland, N. Cohen, M. Vaida, D. Tang, C. M. Baumgarten, J. Matthews, and D. G. Simpson, "Regulation of Cellular Infiltration into Tissue Engineering Scaffolds Composed of Submicron Diameter Fibrils Produced by Electrospinning," *Acta Biomaterialia*, 1, 377 (2005).

S. L. Shenoy, W. D. Bates and G. E. Wnek, "Perspectives on Fiber Formation in Electrospinning," *Polymer*, in press.

Co-Authored and Edited Text Books (5)

A. K.-Y. Jen, C. Y.-C. Lee, L. R. Dalton, M. F. Rubner, G. E. Wnek and L. Y. Chiang, eds. *Electrical, Optical and Magnetic Properties of Organic Solid State Materials*, MRS Symp. Proc. Vol. 413, Pittsburgh, 1996.

D. L. Wise, D. J. Trantolo, T. M. Cooper, G. E. Wnek and J. D. Gresser, eds., *Photonic Polymer Systems: Fundamentals, Methods and Applications*, Marcel Dekker, New York (1998).

D. L. Wise, D. J. Trantolo, T. M. Cooper, G. E. Wnek and J. D. Gresser, eds., *Electrical and Optical Polymer Systems: Fundamentals, Methods and Applications*, Marcel Dekker, New York (1998).

D. L. Wise, A. M. Klibanov, R. Langer, A. G. Mikos, N. A. Peppas, D. J. Trantolo, G. E. Wnek and M. J. Yaszemski, eds., *Handbook of Pharmaceutical Controlled Release Technology*, Marcel Dekker, New York (2000).

G. E. Wnek and G. L. Bowlin, eds., *Encyclopedia of Biomaterials and Biomedical Engineering*, Marcel Dekker, New York (2004).

Patents Issued

G. E. Wnek, "Electrically Conducting Polymer Blends," U.S. 4,394,304 (July 19, 1983).

G. E. Wnek, "Electrically Conducting Polymer Blends," European Patent 99,914 (Dec. 30, 1986).

A. Guiseppi-Elie and G. E. Wnek, "Stabilization of Iodine-Doped Polyacetylene in Aqueous Solutions," U.S. 4,499,002 (February 12, 1985).

G. E. Wnek and D. H. Whitney, "Substituted Acetylenic Polymers and Conductive Materials Formed Therefrom," U.S. 4,672,093 (June 9, 1987).

J. K. Liu and G. E. Wnek, "Sulfonated Silicones and Methods for Their Production," U.S. 5,326,890 (July 5, 1994).

S. G. Ehrenberg, J. M. Serpico, G. E. Wnek and J. N. Rider, "Fuel Cell Incorporating Novel Ion-Conducting Membrane," U.S. 5,468,574 (November 21, 1995).

J. D. Gresser, D. J. Trantolo, D. L. Wise and G. E. Wnek, "Method of Making Biopolymer-Based Nonlinear Optical Materials," U.S. 5,512,218 (April 30, 1996).

J. M. Serpico, S. G. Ehrenberg, G. E. Wnek and T. N. Tangredi, "Gas Diffusion Electrode," U. S. 5,677,074 (October 14, 1997).

S. G. Ehrenberg, J. M. Serpico, G. E. Wnek and J. N. Rider, "Fuel Cell Incorporating Novel Ion-Conducting Membrane," U.S. 5,679,482 (October 21, 1997).

T. Przybycien, G. E. Wnek, P. Lam and P. Elliker, "Electrochemical Separation Utilizing Metalloporphyrins and Metallophthalocyanines," U. S. 5,711,867 (January 27, 1998).

L. Berlowitz-Tarrant, R. Nicolosi, T. N. Tangredi and G. E. Wnek, "Sulfonated Triblock Copolymer and Uses Thereof," U. S. 5,840,387 (November 24, 1998).

B. M. Sheikh-Ali and G. E. Wnek, "Ion-Conducting Membrane for Fuel Cell," U. S. 6,110,616 (August 29, 2000).

D. J. Vachon and G. E. Wnek, "Medical Uses of Styrene Sulfonate Polymers," U.S. 6, 306, 419 (October 23, 2001).

S. G. Ehrenberg and G. E. Wnek, "Water-and Ion-Conducting Membranes and Uses Thereof," U.S. 6,383,391 (May 7, 2002).

G. E. Wnek and S. G. Ehrenberg, "Water-and Ion-Conducting Membranes and Uses Thereof," U.S. 6,413,298 (July 2, 2002).

G. L. Bowlin, G. E. Wnek, D. G. Simpson and L. Terracio, "Engineered Muscle," U.S. 6,592,623 (July 15, 2003).

G. Tepper, D. Pestov, N. Levit and G. Wnek, "Molecular Imprinting of Small Particles, and Production of Small Particles From Solid State Reactants," U. S. 6,660,176 (December 9, 2003).

G. L. Bowlin, G. Wnek, D. G. Simpson, P. Lam, M. E. Carr and H. Fillmore, "Plasma-Derived Fibrin-Based Matrices and Tissue," U.S. 6,787, 357 (September 7, 2004).

J. M. Serpico, S. G. Ehrenberg and G. E. Wnek, "Crosslinked Polymer Electrolyte Membranes for Heat and Moisture Exchange Devices," US 6,841, 601 (January 11, 2005)

Issued Patents On Which I Am Named As Inventor Or Co-Inventor (18)

G. L. Bowlin, G. E. Wnek, D. G. Simpson, P. Lam and M. E. Carr, "Electroprocessed Fibrin-Based Matrices and Tissue," 20020042128 (April 11, 2002)

G. L. Bowlin, G. E. Wnek, D. G. Simpson, "Electroprocessing in Drug Delivery and Cell Encapsulation," 20020081732 (June 27, 2002).

D. G. Simpson, G. L. Bowlin, G. E. Wnek, P. G. Stevens, M. E. Carr, J. A. Matthews and S. Rajendran, "Electroprocessed Collagen," 20020090725 (July 11, 2002).

G. L. Bowlin, G. E. Wnek, D. G. Simpson, P. Lam, M. E. Carr and H. L. Fillmore, "Plasma-Derived Fibrin-Based Matrices and Tissue," 20020094514 (July 18, 2002).

J. M. Serpico, S. G. Ehrenberg and G. E. Wnek, "Crosslinked Polymer Electrolyte Membranes for Heat and Moisture Exchange Devices," 20030118887 (June 26, 2003).

G. L. Bowlin, D. G. Simpson and G. E. Wnek, "Electroprocessing Polymers to form Footwear and Clothing," 20030207638 (Nov. 6, 2003).

J. M. Layman, G. E. Wnek, and E.-R. Kenawy, "Electrospinning of Vinyl Alcohol Polymer and Copolymer Fibers," 20030215624 (Nov. 20, 2003).

G. L. Bowlin, G. E. Wnek and D. G. Simpson, "Engineered Muscle," 20040009600 (Jan. 15, 2004).

G. E. Wnek, M. E. Carr, G. L. Bowlin, K. I. Cohen, K. R. Ward, W. Barbee and R. Ivatury, "Treatment for High-Pressure Bleeding," 20040013715 (Jan. 22, 2004).

G. E. Wnek, D. G. Simpson, G. I. Bowlin, L. Yao, E.-R. Kenawy, J. M. Layman, E. H. Sanders and J. B. Fenn, "Electroprocessing of Materials Useful in Drug delivery and Cell Encapsulation," 20040018226 (Jan. 29, 2004).

D. G. Simpson, G. L. Bowlin, G. E. Wnek, P. J. Stevens, M. E. Carr, J. A. Matthews and R. Saravanamoorthy, "Electroprocessed Collagen and Tissue Engineering," 20040037813 (Feb. 26, 2004).

G. L. Bowlin, G. E. Wnek and D. G. Simpson, "Electroprocessing in Drug Delivery and Cell Encapsulation," 20040058887 (March 25, 2004).

G. L. Bowlin, G. E. Wnek and D. G. Simpson, "Electroprocessed Collagen," 20040116032 (June 17, 2004).

D. J. Vachon and G. E. Wnek, "Sulfonated Styrene Copolymers for Medical Uses," 20040142910 (July 22, 2004).

Invited Lectures, 2000-

"Materials Science on the Nervous System," VCU/MCV Mini-Med School, Virginia Museum of Science, Richmond, March 8, 2000.

"Electroactive Polymers in Electronics and Medicine," Symposium on Polymers in the New Millennium, ACS Meeting, San Francisco, CA, March 29, 2000.

"Polymer Science on the Brain," Dept. of Polymer Science and Engineering, University of Massachusetts, Amherst, April 28, 2000.

"Materials Science on the Nervous System," Dept. of Materials Science and Engineering, University of Delaware, May 11, 2000.

"The Broad Scope of Electroactive Polymers: From Proton-Conducting Membranes to Biomaterials," Army Research Laboratory, Aberdeen, MD, May 17, 2000.

"Chemical Engineering on the Brain," Chemistry Seminar, University of Richmond, September 8, 2000.

"Ion Conducting Polymers and Their Applications," Air Products Research Center, Allentown, PA, September 28, 2000.

"Electrospraying and Electrospinning of Polymers for Biomedical Applications. Poly(Lactic-co-Glycolic Acid) and poly(Ethylene-co-Vinyl Acetate)," 32nd Annual SAMPE Meeting, Boston, November 8, 2000.

"Properties and Applications of Sulfonated Kratons," Shell Westhollow Research Center, Houston, TX, November 16, 2000.

"New Li-Ion Electrolytes Derived from Functionalized Polyphenols," 3rd Hawaii Battery Conference, Waikalua, January 5, 2001.

"Production of Microfibers by Electrospinning," Philip Morris Technical Center, Richmond, VA, February 13, 2001

"Electrospinning of Biomaterials," S. K. Tripathy Memorial Symposium, U. Massachusetts Lowell, February 16, 2001.

- "Electric Field-Mediated Processing of Biomaterials: Toward Nanostructured Biomimetic Systems," SPIE Annual Meeting, Newport Beach, CA, March 8, 2001.
- "Thinking Small at the Engineering/Medical Interface," Molecular Cell Biology and Biotechnology Seminar Series, Virginia Tech, Blacksburg, April 27, 2001.
- "Small Thinking About Old Polymers at the Medicine/Engineering Interface," Program in Polymer Science & Technology seminar series, MIT, Cambridge, MA, May 16, 2001.
- "Electrospinning of Biomaterials," Fiber Society Meeting, Raleigh, May 23, 2001.
- "Sulfonated Styrene-Based Proton Exchange Membranes," Session on Macromolecular Assemblies for Electronic and Photonic Applications, ACS National Meeting, Chicago, August 28, 2001.
- "Small Thinking About Old Polymers at the Medicine/Engineering Interface," Chemical Engineering Seminar, Worcester Polytechnic Institute, Worcester, MA, October 18, 2001.
- "Electroactive Polymers in Medicine and Energy Conversion," Search for Electroactive Materials (SEAM) meeting, Polytechnic University, Brooklyn, Dec. 1, 2001
- "Electrostatic Processing of Polymers," James McGrath Applied Polymer Science Award Symposium, Orlando ACS Meeting, April 9, 2002.
- "Small Thinking About Old Polymers at the Medicine/Engineering Interface," Department of Chemical Engineering, University of Colorado, Boulder, September 10, 2002.
- "Nanoscale Delivery, Surgery and Implant Devices," 2002 Virginia Biotechnology Summit and Governor's Conference on Technology Transfer and University Research, Herndon, VA, October 15, 2002.
- "Thinking Small About Old Polymers at the Medicine/Engineering Interface," Golden Gate Polymer Forum, Mountain View, CA, November 12, 2002.
- "Thinking Small About Old Polymers at the Medicine/Engineering Interface," ACS Workshop on Polymers in Medicine and Biology, Sonoma, CA, November 16, 2002.
- "Toward New Synthesis and Processing Approaches for PEM Components," ACS Conference on Advances in Materials for Proton Exchange Membrane Fuel Cell Systems, Asilomar, CA, February 24, 2003.
- "Polymer Micro- and Nanofibers and Applications to Dentistry," School of Dentistry, VCU, Richmond, February 12, 2003.
- "Thinking Small About Old Polymers at the Medicine/Engineering Interface," Alza Corp., Palo Alto, CA, February 27, 2003.
- "Polymer Micro- and Nanofibers by Electrospinning," Department of Chemical Engineering, Case Western Reserve University, Cleveland, OH, March 6, 2003.
- "Polymer Micro- and Nanofibers by Electrospinning," Department of Chemical Engineering, Rensselaer Polytechnic Institute, Troy, NY, March 19, 2003.
- "Polymer Micro- and Nanofibers by Electrospinning," Department of Chemical Engineering, Georgia Institute of Technology, Atlanta, June 19, 2003.

"Electrospinning of Biomimicking Tissue Engineering Scaffolds," Gordon Research Conference on Biomaterials: Biocompatibility/Tissue Engineering, Holderness School, Plymouth, NH, July 21, 2003.

"Polymers in Tissue Engineering and Fuel Cells: Examples of Entrepreneurship in Engineering," Case Western Reserve University, Cleveland, OH, December 4, 2003.

"Electrostatic Polymer Processing: Applications to Biomaterials and Electrochemical Devices," S. K. Tripathy Annual Memorial Symposium, UMass Lowell, Dec. 5, 2003.

"Electrostatic Polymer Processing: Applications to Biomaterials and Electrochemical Devices," University of Florida, Dept. of Chemical Engineering, January 7, 2004.

"Opportunities and Engineering Challenges for PEM Fuel Cells," AIChE-ASME joint local section meeting, Richmond, VA, January 22, 2004.

"Electrostatic Polymer Processing: Applications to Biomaterials and Electrochemical Devices," Yale University, Dept. of Mechanical Engineering, March 24, 2004.

"Polymer Nanofibers by Electrospinning and Applications in Medicine," Symposium on Nanotechnology and Education, ACS Meeting, Anaheim, CA, March 29, 2004.

"Electrostatic Polymer Processing: Applications to Biomaterials and Electrochemical Devices," Dept. of Polymer Engineering, University of Akron, April 9, 2004.

"Electrostatic Polymer Processing of PEMFC Components," Gordon Research Conference on Fuel Cells, Roger Williams University, Bristol, RI, July 29, 2004.

"Polymer Engineering for Energy Conversion Technologies," Frontiers in Chemistry Series, Case Western Reserve University, October 28, 2004.

"Nanomaterials for Fuel Cells," PolymerOhio Emerging Technology Forum, Case Western Reserve University, November 17, 2004.

"Electrostatic Polymer Processing Applied to PEMFC Fabrication," ACS workshop on New Advances in Proton Exchange Membrane Fuel Cells, Asilomar, CA, February 23, 2005.

"Medical Applications of Electrostatic Polymer Processing," Guidant Corporation, Santa Clara, CA, February 23, 2005.

"Polymer Engineering for Energy Conversion Technologies," Golden Gate Polymer Forum, Mountain View, CA, February 23, 2005.

"Structure-Property Relationships in Biopolymers," ACS short course on Polymers in Medicine, Richmond, VA, June 8, 2005.

"Electrostatic Polymer Processing Applied to PEMFC Fabrication," 1st Symposium on Manufacturing of MEAs for Hydrogen Applications, Dayton, Ohio, August 10, 2005.

"Nanomaterials with Applications to Medicine and Energy," Materials Science and Engineering Alan Lawley Seminar, Drexel University, Philadelphia, November 1, 2005.

"Electrostatic Polymer Processing Applied to PEMFC Fabrication," Pacific Polymer Conference, Maui, HI, December 12, 2005.

"Nanomaterials with Applications to Medicine and Energy," Materials Engineering colloquium, Purdue University, W. Lafayette, IN, March 3, 2006.

"Applying TRIZ Methodology to Innovation Strategy," Ohio Polymer Summit, Columbus, May 23, 2006 (with Zion Bar-El).

"Nanomaterials with Applications to Medicine and Energy," Dow Discussion Group on Interface Science, Dow Chemical Co., Midland, MI, May 24, 2006.

"Electrospinning of Polymers: Fundamentals and Medical Applications," International Conference on Polymer Chemistry, Dalian, China, June 10, 2006.

"Electrospinning of Polymers: Fundamentals and Medical Applications," Mini-Symposium on Functional Polymers and Nanostructured Materials for Biotechnology and Medicine, Shanghai Jiao Tong University, Shanghai, China, June 12, 2006.

Short Courses

"Practical Polymer Science," Denison Manufacturing Co., Framingham, MA, February-March 1981 and May 1986.

"Electrical Properties of Polymers," one-week summer course, MIT, Cambridge, MA, 1985-1989.

"Electrically Conducting Polymers," ACS Satellite TV Course, Washington, DC, March 16, 1990 (with P. D. Calvert and D. J. Meier).

"Polymer Chemistry," three-day short course for college faculty, Temple University, Philadelphia, March 29-31, 1990.

"Chemistry and Materials Science," NSF Chautauqua Course for College Teachers, U. of Pittsburgh, June 16-18, 1994.

"Chemistry and Materials Science," NSF-UFE Short Course, Bucknell U., Lewisburg, PA, August 4-6, 1994.

"Polymer Chemistry for University Faculty," NSF-supported, 3-week summer course at RPI (G. E. Wnek, P.I., with S. Krause and J. A. Moore), 1989, 1991, 1993 and 1996.

"Essentials of Polymer Chemistry," ACS Satellite TV Course, Washington, DC, March 23 and 25, 1998 (with J. E. McGrath, K. J. Wynne and D. A. Tirrell; organized by G. E. Wnek).

"Polymers in Medicine: Principles and Practice," ACS short course held at VCU, June 2003; organized by K. J. Wynne, co-organized by G. E. Wnek.

"Polymers and Bio-Polymers in Medicine," Golden Gate Polymer Forum Short Course, May 5-7, 2006 (co-organized co-taught with Allan Hoffman and Stuart Williams).

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